Documentation Digital Turntable

Part of the Documentation of

Stellwerk easy Version 8.0

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T a b l e   o f   C o n t e n t s

<u>I l l u s t r a t I o n   L I s t</u>

10 Digital Turntables

10.1 General

Up to two digital turntables can be defined in a track layout. The supported digital turntable types are based on the mode of the Märklin turntable 7286 or the accompanying function modules. This means, there will be used special, not changeable magnetic articles commands to control each of max. two turntable modules. They can be used by any digital system (Motorola and DCC) with corresponding module/decoders. In addition to the Märklin turntable the mode will be used also for Fleischmann turntables in N and H0 scale. Still, the company Littfinski has released a turntable decoder TT-DEC, which is using this mode as a basis. With this hardware the routines of Stellwerk easy have been tested.

The **Turntable Decoder TT-DEC** of the company Littfinski supports the following turntable types:

> the **Fleischmann Turntables 6052**, **6152**, **6154**, **6651**, **9152**, **6680**
> (both with and without "**C**") and **6652** (with 3-wire track)
> the **Roco Turntable 35900**, as well as the **Märklin Turntable 7286**.

By default, all of these turntables use 48 sectors (at TT-scale =24), but only up to 24 direct "track control commands" are available for the bridge positions of the turntable. These used magnetic article numbers are not changeable and listed at chapter 10.7; for these magnetic article numbers the standard definition window is <u>not</u> used. Please, read the hardware manual of the relevant manufacturer before connect the turntable. Furthermore, the turntables must be programmed before they can be used in reality.

10.2 Creating of a digital turntable

Three steps are necessary in program before a turntable can be used:

- Definition of a turntable symbol by several different single symbols
- Fixing the track assignments
- Programming of the digital turntable

Later controlling can be:

- directly by clicking on the special track layout symbols,
- within an own turntable window,
- positioning by switch routes,
- automatically by contact control and/or
- with a schedule command.

The following sections will show details to all these points.

10.3 Construction with turntable track symbols

There are additional graphic symbols for construction and so you can build turntables in arbitrary size, e.g. small and medium size turntables:

Graphic: Turntable examples with connected tracks
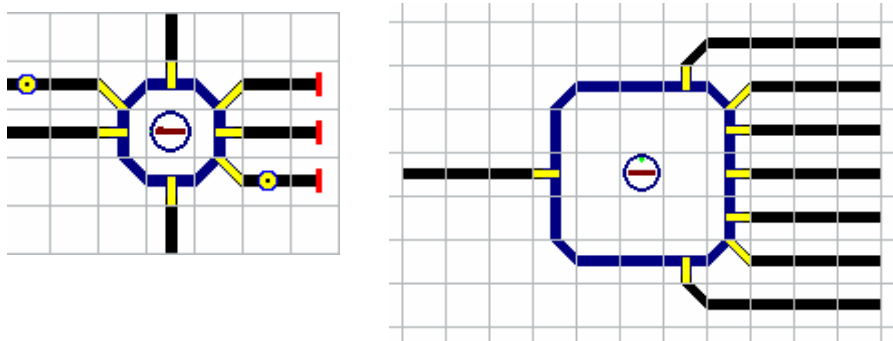
Following symbols for turntable definition are available and can be find by clicking the (4th. selection icon) "General magnetic article and help symbols". They have the meanings:

> (in figure only one type within a group):

>   4 different diagonal 'tracks' in dark blue as border without track entries/exits.

 2 different straight 'tracks' in dark blue as borders without track entries/exits.

 4 different straight track entries/exits.

 4 different diagonal track entries/exits.

 1 turntable main symbol

At first these symbols can be assembled to a turntable picture in the track layout and the main turntable symbol can be placed in the middle of the turntable or anywhere to a different place. The 2nd. part of the definition - named assignment- will be started by clicking upon the main turntable symbol by the left mouse button.

10.4 Fixing track assignments

With a left click on the turntable main symbol the window for "Definition of track assignments" will be opened, and if previously no assignments have been fixed before by Stellwerk easy, the following window is shown:

Window: Definition of track assignments for a turntable
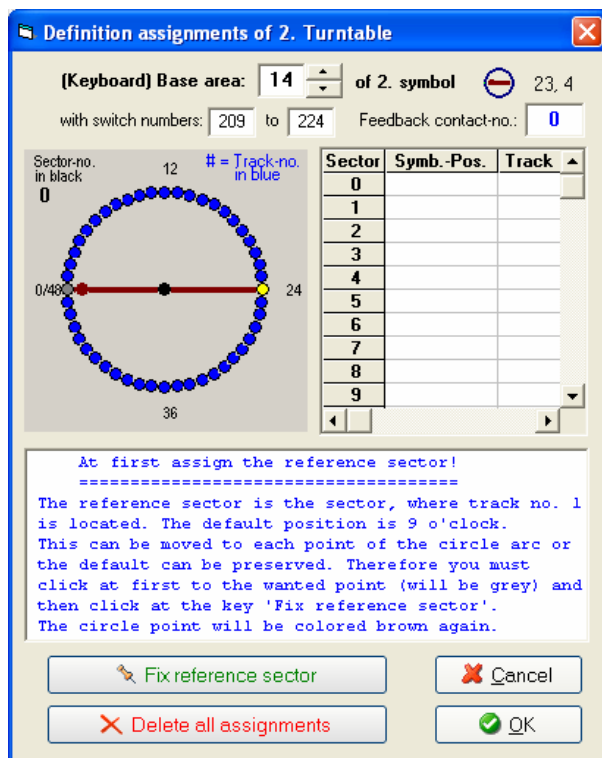
Keyboard Base area:
Here you can determine whether the 1st. or 2nd. area of switch numbers should be used. The accompanying switch numbers are displayed. If two turntables are used, they must have different base areas.

Feedback contact-no.:
Here you can define a contact number if you are using the decoder TT-DEC of the company Littfinski to receive a feedback for "position was reached".

Fix reference sector:
This is for fixing the reference-sector, i.e. position of track number 1 (default is at 9:00 o'clock position).

Delete all assignments:
All fixed changes or new of assignments are deleted, now ready for starting of new assignments.

By **Cancel** the window is closed without changes. By **OK** the settings are saved in working memory and the window is closed.

On the left side of the screen is the image of a turntable with 48 blue sector-points and the brown revolving bridge in its standard position (horizontal). The brown point shows to the position of the control house upon the bridge.
The window contains some position terms:
      On 'sector-no. in black' the positioned sector-no., here = **0**
      In positioning on a sector-no the assigned track-no. will be displayed e.g in blue. as # 1 or
      e.g. in red as #-4 (the latter value means assignment is without an entry/exit).
      The sector numbers 0/48.12 24 and 36 are displayed in black (mostly.

A small grid is displayed at the right window part, in which the fixed assignments can be seen.
      Sector: All possible 48 sector numbers are present.
      Symb-Pos: Here the positions of the track entries/exits are displayed with the X, Y-coordinates.
      Track: the assigned track numbers are listed here. Since the maximum of 24 tracks in ascending order for the half-circle can be defined only, the points rotated to 180°s received the consequent negative track numbers, for example when track-no. 1 on

sector 0 was defined, then gets an entry/exit on sector 24 the track-no. -1. In the table track numbers are displayed in green if even and in red if odd.

In addition, several help text lines are displayed in relation of assignment.

10.4.1 First assignment of tracks numbers

At first the reference-sector must be fixed. The reference-sector is the sector, where track-no. 1 will be situated. The position "9 o'clock" is the default. It may be moved to any arc point or retained. Therefore, you click first on the desired point (will be GREY) and then press the button "Fix reference sector". The circle point is again BROWN.

1a. For fixing a new assignment click on the sector-point with **left or right mouse button** (point will be BROWN) or
1b. To cancel an existing assignment click on the sector-point **with middle mouse button** (point will be RED).
2.   Then always click on the turntable track symbol within the **track layout** (point will be GREEN=used or BLUE=free).
3.   If the sector has no track entry/exit, you can click on the turntable main symbol. In this way later this position can be reached by the program also (using switch routes, contact or schedule control).

In this way assign the track entries/exits. At the end the turntable picture at the left could look e.g. as follows:

Graphic: Turntable with assigned track entries/exits
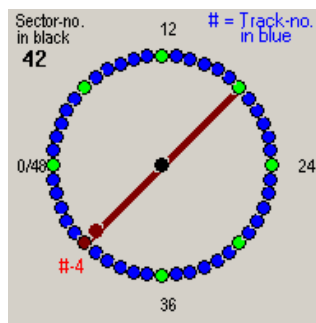
green points:
7 fix track assignments are defined, i.e. for the sectors **0, 6, 12, 18 and 24, 30, 36**. These are displayed with their track no. in blue in if positioned, e.g. as # 1.

yellow points:
Point will be yellow, if there is no track entry/exit fort his sector number, but for the opposite point.

brown point:
positioned to a sector with an assignment to the turntable main symbol only. The track number is displayed in red e.g. as #-4.

With **OK** the window is closed with saving in working memory, with **Cancel** will be no change in the previous assignment.

10.4.2 Extension of track assignments

If an already assigned turntable should be extended or changed, for instance because extensions in the meantime are made or the current assignment is incorrect, so call the assignment window again by clicking the left mouse button on the turntable main symbol. You will receive the current status of the assignments for the chosen turntable no. 1 or 2.

Add a new track assignment by right or left clicking on the respective sector point or erase an already assigned sector point by click on the middle mouse button as described in previous section. The track numbers are set automatically new with starting the begin at reference sector; so the correct existing assignments need not to be re-assigned.

With **OK** the window is closed with saving in working memory, with **Cancel** will be no change in the previous assignment.

10.4.3 Reassignment of all tracks numbers

Shall an already fixed turntable fully new assigned e.g. because expansions were changed or the previous assignment wasn't right, then click on the button "**Delete all assignments**" and then as next fix the reference sector by the button "**Fix reference sector**". The further assignment is done again as described in the upper section.

With **OK** the window is closed with saving in working memory, with **Cancel** will be no change in the previous assignment.

10.4.4 Meaning of the sector points colors

The sector points can get various colors during the assignment. All are listed here.

- 🔵 blue point   = Not still assigned sector.
- ⚫ grey point   = Set for fixing the reference sector.
- 🔴 brown point   = Set to a position before the assignment.
              within revolving bridge: signal for position the 'control-house'
- 🟡 yellow point   = No assignment with track entry/exit, e.g. either
              for the 180°s position of the chosen sector.
- 🟢 green point   = Assignment with track entry/exit fort his sector.
- 🔴 red point   = Position for deleting of an assignment.

10.5 Programming of the digital turntable

10.5.1 General

The next step using a digital turntable is its programming; then the single assigned sectors can specifically be chosen about the track numbers.   The programming is executed during 'Processing mode' after the digital turntable and decoder have been connected as described in the manufacturer hardware documentation. Don't use for programming the "Programming track output" but only the normal track part, it must be the same condition as for switching points or control engines.

The sub-point "Programming of digital turntables" is under the menu item "Extras". A window in which the programming can be executed manually or automatically gets open by this command line.

Window: Programming of the digital turntables
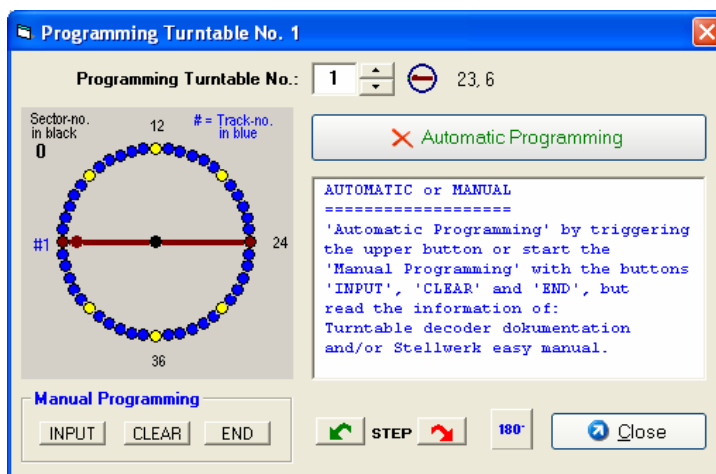
At "**Program turntables no**."
you can select between the numbers 1 and 2 at most, if this turntable number was defined before.

If no turntable is defined or the wanted turntable hasn't got any track assignments yet, so the programming is not possible and an error message will be displayed

The left turntable picture shows the present track assignments for the sectors and the opposite ones.

- 🔵   blue = sector with no assigned track number,
- 🟡   yellow = assigned with a track number,
- 🔴   brown = sector 0 for track #1

There are the following buttons:

Automatic Programming   for starting the automatic routines in several steps.

    For the first positioning and during manual programming use.

With the left green STEP-button the turntable can turn one sector anti clockwise and with the right red STEP-button can turn one sector in the clockwise.

With the 180 °s-button the turntable can get around 180°s revolved.

Manual Programming
INPUT   CLEAR   END

These three buttons **INPUT**, **CLEAR** and **END** can be used only during manual programming.

Close terminates the programming und closes the window.

Please, to the preparation of the programming you should read the corresponding hardware descriptions and the accompanying decoders/keyboards of the manufacturer. At first there are several preparations necessary. If using e.g. the DEC-TT turntable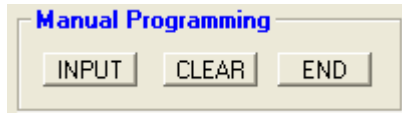 decoder of the company Littfinski, these are the items up to section 4.2 in its documentation. These necessary preparations are put on here also as notes:

- The turntable type must be fixed (pin bridge at the DEC-TT), and the turntable must be connected correctly (see hardware description),
- the hardware programming part must be finished to the recognition of the data format (Motorola or DCC at the DEC-TT decoder),
- every sector must be positioned fault-freely by revolving and
- the revolving speed must be adjusted (potentiometer of DEC-TT).

After these conditions are true, you can now select:
    'Automatic Programming' by triggering the upper button or the
    'Manual Programming' with the buttons 'INPUT', 'CLEAR' and 'END'
For the manual programming especially read also your turntable/decoder documentation, please.

### 10.5.2 Automatic programming
You click (1st.time) the button **'Automatic Programming'**

1. Change the turntable decoder into the programming mode e.g. at 'Littfinski TT_DEC' the (left) **green LED** will flash.
2. Trigger then (2nd. time) the **'Automatic Programming'**!
3. The command **INPUT** will be sent and maybe the 'revolving bridge' drives to the last programmed track number 1, this is the 'reference sector'.
4. Following approx. 6 seconds break.
5. Please, wait until there is no moving of the turntable!
6. If the turntable has not the position sector 0 (for track no. 1) or is around 180°s, so click the 180°s-button or the STEP-buttons to this position.
7. Clicking the button **'Automatic Programming'** only then again (3rd. time).
8. Now the commands for programming are sent automatically, are displayed and the turntable will revolve to each next sector clockwise until the sector 23 is reached.
9. Then reverses the turntable to the reference sector and after a break of approx. 30 seconds the programming is ready (END was sent) and you can leave the window by "Close" when bridge stops.
10. If the programming wasn't successful, then it should be repeated or be changed over to the manual programming.

10.5.3 Manual Programming
The manual programming should always used if you want to program as described in your turntable/decoder documentation exactly or it was a successful method for you till now. Because all turntables or the necessary decoder types have different programming conditions, only the example of a turntables decoder TT-DEC of the company Littfinski shall be shown here:

Graphic: Littfinski Decoder TT-DEC with Fleischmann turntable

Fleischmann Drehscheibe
Fleischmann Turntable
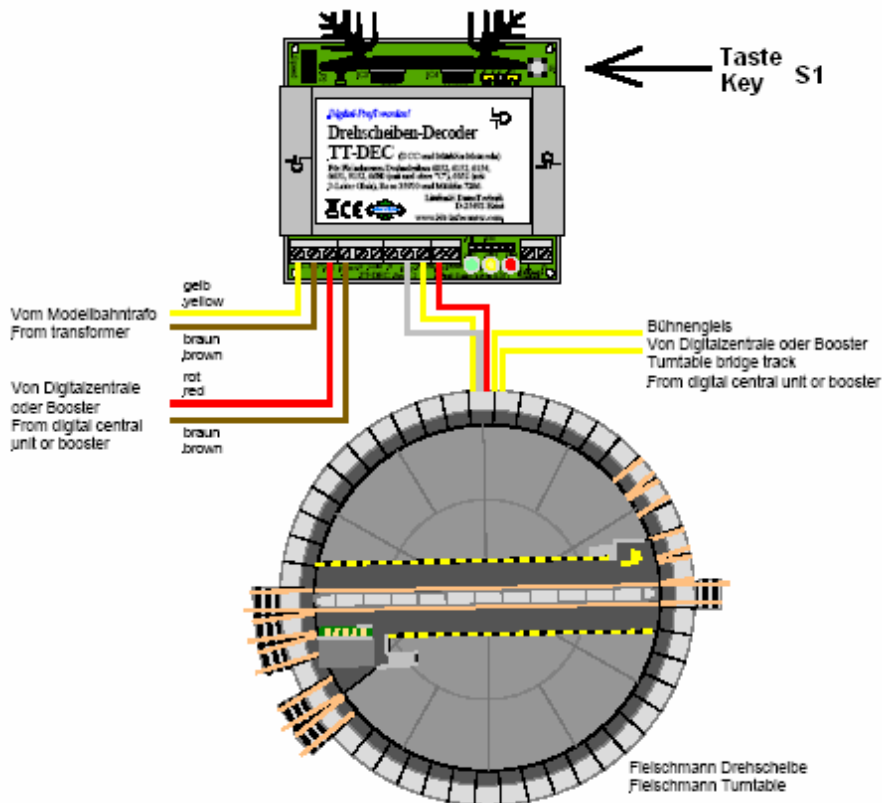
1. **Press shortly 2 times** the key **S1 (at 'cool body')**. The **left green LED flashes**.
2. **Send** now the command **>INPUT<**. The **right red LED will shortly switch-off** and the turntable bridge turns eventually to the last programmed reference track.
3. **Turn** now the **turntable bridge** with the commands **>STEP<** (clockwise or anti clockwise) to the **track 1** (**reference track= sector 0)**.
4. **Send** now in accordance to the **operation instruction** of your **digital central unit** or send with the button in programming window of **Stellwerk easy** the command **>CLEAR< and >INPUT<** to store the position **track 1** (**reference track**). The **right red LED will switch-off shortly**.
5. **Turn** the **turntable bridge** with the command **>STEP< clockwise** to the **next required track connection. Please consider** eventually as well **single opposite track connections**.
6. **Store** the **track connection** with the command **>INPUT<**. The **right red LED will switch-off shortly**.
7. **Prepare further track connections on same way**.
8. If you have **completed** the **programming** of **all track connections** send the command **>END<**. The **turntable bridge will turn** to **track 1** (r**eference track= sector 0**) and the **programming mode** will be **automatically finalized**. If the turntable bridge will not return to the defined reference track you have to repeat the programming process.

Whether by automatically or manually programming the turntable must be now 'ready for use', all settings are fixed and the turntable can be control in reality.

10.6 Control of digital turntables

All 5 different control possibilities will be explained in the next sections:

- using a turntable control window,
- directly by clicking on one of the provided track symbols,
- by a switch route,
- automatically with contact control and/or
- with a schedule command

The turntable using with a decoder TT-DEC of the company Littfinski can fix a contact number in the turntable definition window. If there is a connection between the decoder and the input to a feedback module, this contact number will be triggered after the turn rotation is ended.: More activities can be executed if this contact has definitions in the track layout

10.6.1 Control with using a turntable control window

The turntable control window can be opened by click with the mouse button on a turntables main symbol during the processing mode. If two turntables are defined for the track layout, then only for one turntable the control window can get open.

The following switching window shows a turntable at which entries/exits were defined and programmed for the sectors 0, 6, 12, 18, 30 and 36, i.e. every 45°s except for sector 42 (is yellow). The point for the sector no. 0 is red, sector points with a track entry/exit are green and the sector point without a track entry/exit is yellow. The revolving bridge stands at this time e.g. on sector no. 6, for which the track entry/exit no. 2 is defined.

Window: Turntable control window
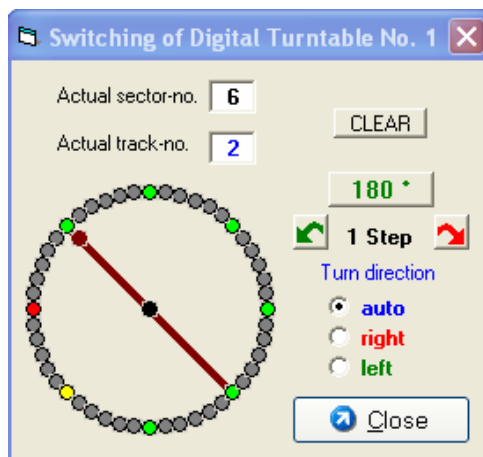
An additional button "**CLEAR**" is used for a special case during processing (see later).

The other buttons are:

180° = for revolving of 180°s (TURN)

 = for moving to the **left** (anti clockwise) or to the **right** (clockwise) to the next track entry/exit point.

Fixing of the drive direction is possible for the direct position to a track/sector number within the turntable control window or directly in the track layout. Possibilities: **auto**, **right** or **left**.

If you click on a green or the red sector point directly, then the turntable moves to sectors appending of 'Turn direction' option as follows:

At option **auto** it's turning on the shortest way to the wanted point. **This should be the normal case of the operation.**

At the **right** or the **left**: The position the turntable bridge moves to the desired sector point, but the revolving bridge already will stop on the opposite track entry/exit if the wanted turn is >180 °s. So the position of the "balcony" is wrong (cause is the Märklin control set). Therefore you should use this only for distances of <= 180 °s and then afterwards use the 180°-button. If there is a wrong "balcony" position, you can click the 180°-button twice and during the bridge is revolving click sector a second time upon the first wanted sector point. The position of the "balcony" will change.

The "**CLEAR**" button can end a fault situation for some turntables types completion e.g. if the turntable revolves permanently by mechanical faults or perhaps sits tightly. After you have placed the turntable bridge in the window to sector 0, you must then move the turntable bridge to this sector 0 manually.

The turntable window is closed by the button **"Close"**, however, you can control the turntable without this open window at the track layout directly, too.

10.6.2 Control by track layout symbols

If in a track layout a digital turntable with the track symbols is defined, assigned and programmed, then direct control to the track entries/exits is possible by click on the desired track entry/exit symbol at the track layout. It doesn't play any roll, whether the turntable window is open or not at this time. The following example shows a part of a track layout according to the turntable control window (from last section). The position of the turntable main symbol is free; here it is situated in the middle of the turntable.

Graphic: Turntable controlled manually by track layout symbols
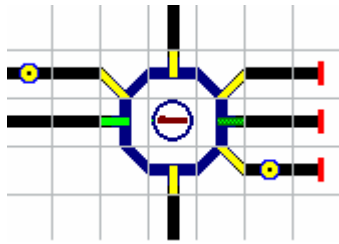
If e.g. a click is executed on the <u>left straight</u> track entry/exit, then the bridge turns to the accompanying sector point automatically and the placed track is marked in **light green** color. The opposite point is marked in dark green color. If the turntable control window is opened, then the position is displayed there too.

The revolving of the bridge is always executed as if you indicated the option "**auto**" in the turntable control window.

10.6.3 Positioning to track entry/exit by a switch route

The symbols of the track entries/exits (e.g. or) can be components of a switch route. If such a switch route will be set (occupied), it will be displayed with all symbols for the new status. The turntable moves to the first defined track entry/exit symbol of the switch route and the turntable status will be displayed also.

Graphic: Switch route controls a turntable
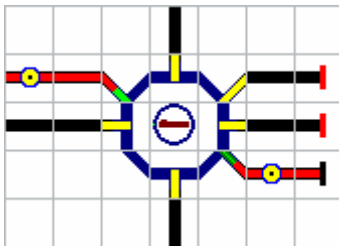
A switch route exists in the represented part with starting from the **left** point.

At occupation time of the switch route the turntable was moved to the <u>left diagonal track entry/exit</u>.
The opposite part of the turntable is indicated also as reserved but it doesn't get any adjusting command.

<u>No reset</u> of the turntable will be executed <u>at free</u> status! Furthermore all single track entries/exits and the complete turntable will not be locked, i. e. also other control positions of the turntable can be executed. These elements work like magnetic articles with set of the option "Allow switching if reserved".

10.6.4 Control the turntables by contact control

The turntables can be controlled also as a part of the contact control activities. For every contact number such activities are possible for both options "Contact occupied" and/or "Contact changing to free". The activities can be defined in the contact definition window respectively. Behind the activity for one magnetic article you find an additional part to control a turntable directly. The next illustration shows this as an example.

Window: Partial view of defining turntables control in contact control

Here the turntable no. 1 should rotate to track no. 3 automatically.

You can select the turntable number 1 or 2 at the first choice. The following values/signs are possible at the <u>second</u> choice:

1 up to 24 = track number
T = rotation of 180°s (TURN) *[corresponding to the scroll position 0]*
-1 up to -24 = negative track number corresponds opposite position of track entry/exit
S = STEP to next position track number *[corresponding to the scroll position 25]*

The rotation direction can be set with the exception for "TURN" as:
<== left, anti clockwise, **auto** = automatic or **==>** right, clockwise.
For all these definitions it isn't checked whether the corresponding definitions for the turntable are already given or not.

10.6.5 Control the turntables by a schedule command

It exists the schedule command **O** (O like Online) to control turntables if the schedule control is used. The command has the following possibilities::

Meaning: triggering a turntable control function

Use: for positioning a turntable

Definition: `O, n, g[, d]`

Parameter: three (n, g and d)
  n   number of the turntable (1 or 2)
  g   positioning to track number 1 up to 24 or -1 up to -24
           or added features
           D or R = for fix the rotation direction
           S =STEP-command (go to next track number)
           T = TURN-command (180°s)
           and furthermore as special features (not used normally)
             C = CLEAR-command
             E = END-command
             I = INPUT-command
  d   A or 0 (zero) =automatic rotation direction
           L or 2 = left turning, anti clockwise
           R or 3 = right turning, clockwise

Notes: If there is no last parameter (d) for a given track number (g), then the automatic direction of rotation is assumed. At the commands T=TURN and also C, E and I the last parameter (d) will be dropped.

Examples: O, 1, 3   = turns the turntable no. 1 to the track no. 3 automatically
                 O, 1, T   = turns the turntable no. 1 around 180 °s
                 O, 1, S, R   = places the turntable no. 1 to next track number
                                    In right direction (clockwise)

10.7 Used switch commands for turntable control

The command codes described as "Märklin mode" can be used with every digital system. The following codes are fixed for the two possible turntables:

Table: Address area of turntable commands

Command	Switch-address for decoder/ keyboard-no.		Status
	15	**14**	
END	225	209	RED
INPUT	225	209	GREEN
CLEAR	226	210	RED
TURN	226	210	GREEN
STEP >	227	211	RED
STEP <	227	211	GREEN
Direction >	228	212	RED
Direction <	228	212	GREEN
Track 1	229	213	RED
Track 2	229	213	GREEN
Track 3	230	214	RED
Track 4	230	214	GREEN
up to ..			
Track 23	240	224	RED
Track 24	240	224	GREEN

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